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This document consists of 1 page and is numbered 1 of 4 copies, series A, and the following - attached.

General Mills, Inc.

MECHANICAL DIVISION
 Engineering Research and Development Department
 2003 East Hennepin Avenue
 Minneapolis 13, Minnesota

Direct Line: MAin 7481

1 October 1954

Dear Bud:

I am sending you under separate cover five (5) copies of the 263P Technical Report, **PERSONNEL-CARRYING BALLOONS**

At this time, I also want to clarify the status of the plastic valves. Since we have designated the current model, the M3 Plastic Valve, it would probably simplify matters by applying the M1 designation to the original plastic valve, and so on. In any case, here is the status of the valves up to the present.

<u>Valve</u>	<u>Capacity</u>	<u>Tested</u>	<u>Production</u>
M1	13#	2-54, 5-54	Yes
M2	40#	7-54	No
M3	60#	<u>No</u>	Yes (present contract)

Very truly yours,

GENERAL MILLS, INC.
 Engineering Research
 and Development

J. C. Warren
 J. C. WARREN
 Balloon and Meteorological
 Systems Group

JCW:jw

25X1

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General Mills, Inc.
Mechanical Division

FILE COPY

**ENGINEERING RESEARCH & DEVELOPMENT
DEPARTMENT**

2003 EAST HENNEPIN AVENUE
MINNEAPOLIS 13, MINN.

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8268 MD-2

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This document consists of *5* pages and is number *1*
of *13* copies, series *A*, and the following attachments.
appendix
photos

263F TECHNICAL REPORT

Contract No. Nonr 875(00)
Annex IV

PREPARED FOR
THE OFFICE OF NAVAL RESEARCH
WASHINGTON, D. C.

Prepared by: J. C. Warren

Date: 30 September 1954

Report No. 1332

GENERAL MILLS, INC.
Mechanical Division
ENGINEERING RESEARCH AND DEVELOPMENT
2003 E. Hennepin Ave.
Minneapolis 13, Minn.

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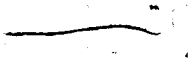
APPENDIX

Time/Altitude Flight 1140

Trajectory Flight 1140

Gross Load vs. Altitude 263P

263P Drawings


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SUMMARY

A personnel-carrying balloon with a volume of 8000 cubic feet was designed according to "Natural Shape" specifications. The design was subjected to a hangar test on 17 February 1954 and was flown successfully on 6 May 1954. This report will cover both experiments.

I. INTRODUCTION

A study of the sphere cone envelopes previously used resulted in the finding of both horizontal and vertical stress concentrations in the envelopes. In the "Natural Shape" balloon, circumferential stresses are eliminated. This concept motivated the redesign of personnel-carrying balloons.

II. THE NEW DESIGNA. Theory of the Natural Shape

Since balloons can be manufactured in any desired shape of closed surface, it is clear that there is a most desired shape.

The principal consideration was stresses, the consequent strain and the relationship between surface area and volume contained. Stresses on the surface area arise from (1) supporting the payload and (2) gas pressure. Those stresses which have a direction which is tangent to the surface and which lie in a vertical plane are called meridional stresses. Tests have shown that the meridional stresses are transferred from the tapes onto the surface area uniformly.

Curvature in a stresses surface produces an inward force per unit area. In a balloon, this force is opposed by the difference in pressure of gas inside and outside. If the inward force created by the meridional stress is nullified everywhere by the gas pressure, the balloon is said to have a "Natural Shape" and has zero circumferential tension.

These ideas were conceived and reduced to practice by General Mills, Inc. under Air Force sponsorship in 1951. Since then, much of the work done on balloon design has been implemented by the University of Minnesota Balloon Physics Group development of design nomographs from use of the analog computer.

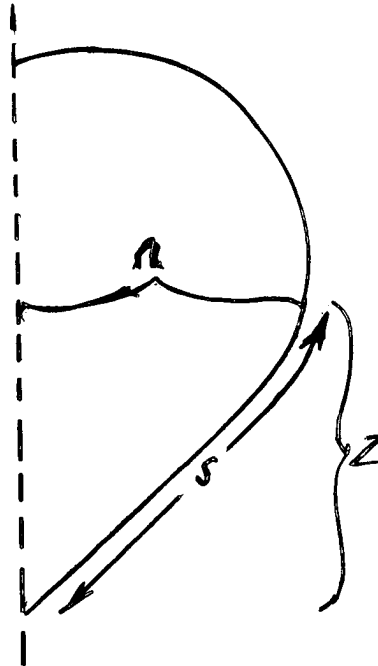
Each shape is characterized by a value of the "balloon fabric parameter Σ ", where Σ is a dimensionless parameter that enters the differential equations when the effect of finite fabric weight is taken into account. The method of obtaining the shapes from the differential equations is as follows:

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Nine different values of Σ were chosen, and for each value the differential equations were solved using the analog computer. These nine shapes were then normalized to give the shape coordinates T, Z, S for balloons of unit gore length, where r and Z give the profile of the balloon and S is the distance of a point on the profile from the bottom apex (measured up along the gore).



Since the Σ value is a ratio of the gross load to balloon weight, the design becomes unique for each case. The following design is based on a maximum load and provides ample material for the envelope to assume its natural shape.

B. Selection of Proper Shape

1. Each shape is characterized by a value of Σ , where $\Sigma = 0$ corresponds to the so-called "weightless natural shape", and larger corresponding to the more oblate shape with heavier fabric weight. The proper value of Σ is uniquely determined by the following quantities.

V = Volume

L = Payload suspended from bottom apex.

W = Weight of fabric material per unit area.

$$= .344 \frac{W}{L} \left[1 + \frac{W^{3/2}}{L} \right]$$

$$= .028$$

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Using the University of Minnesota nomograph, curve #2 was selected where $\Sigma = .05$. This Σ value produces an envelope profile as shown in Figure

Note: The nine different values of Σ chosen were from zero to .40 in .05 increments. Since the optimum value (.028) lies between curve for 0 and .05, .05 was selected. This means there is slightly more material than needed for the envelope to assume its natural shape with existing loads.

2. Tailoring of the shape selection consisted of the following.

a. The gore layout was modified at stations #19 and #29 so that the profile would be symmetrical.

b. To provide for a two point suspension at the bottom apex of the balloon, two gores were tailored in the following manner. A line was drawn from a point, corresponding to the desired width at the base of the balloon, tangent to the gore. The resulting pattern provided the necessary width at the balloon base and precluded the inclusion of separate wedge gores. This device in no way affected the balloon diameter, and the minimum addition had only a negligible effect on the volume of the balloon.

III. THE HANGAR TEST

1. Objectives

A balloon was fabricated on the basis of the foregoing specifications and hangar-tested on 17 February 1954. Objectives of the test were as follows:

- a. Test the new design.
- b. Determine effects of tailored gores to provide a two point suspension.
- c. Measure M1 plastic value capacity in a stable atmosphere.
- d. Confirm the design volume.

2. Details of Testing

The following pictures show the balloon at 200 pounds of lift, 400 pounds of lift and when full at 517 pounds of lift.

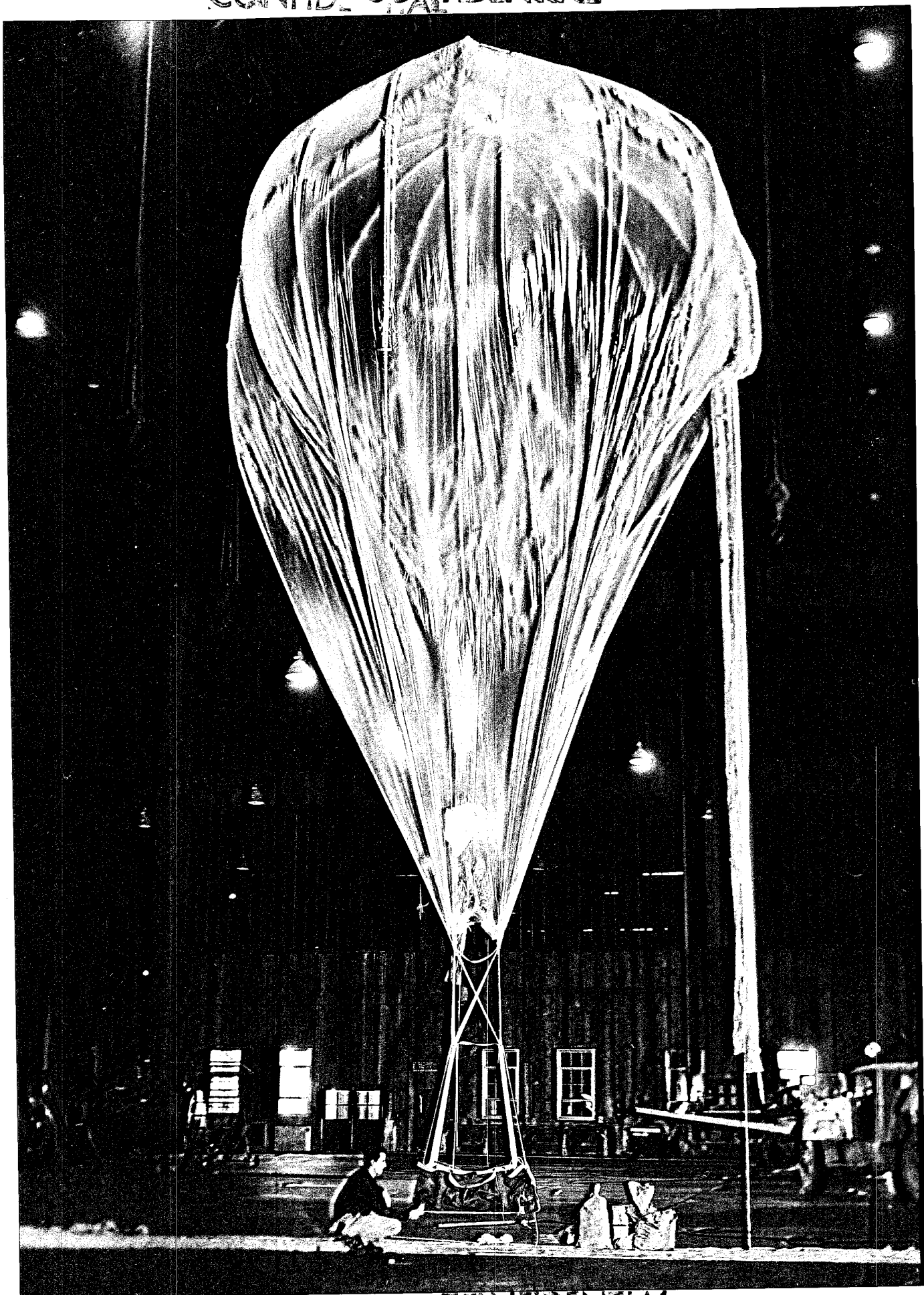
At full inflation the system was lifted off the ground and thrown down again several times sending shock waves up and down the fabric and creating a whipping action.

Two tests of the value, one for one minute and the other for five minutes, were made.

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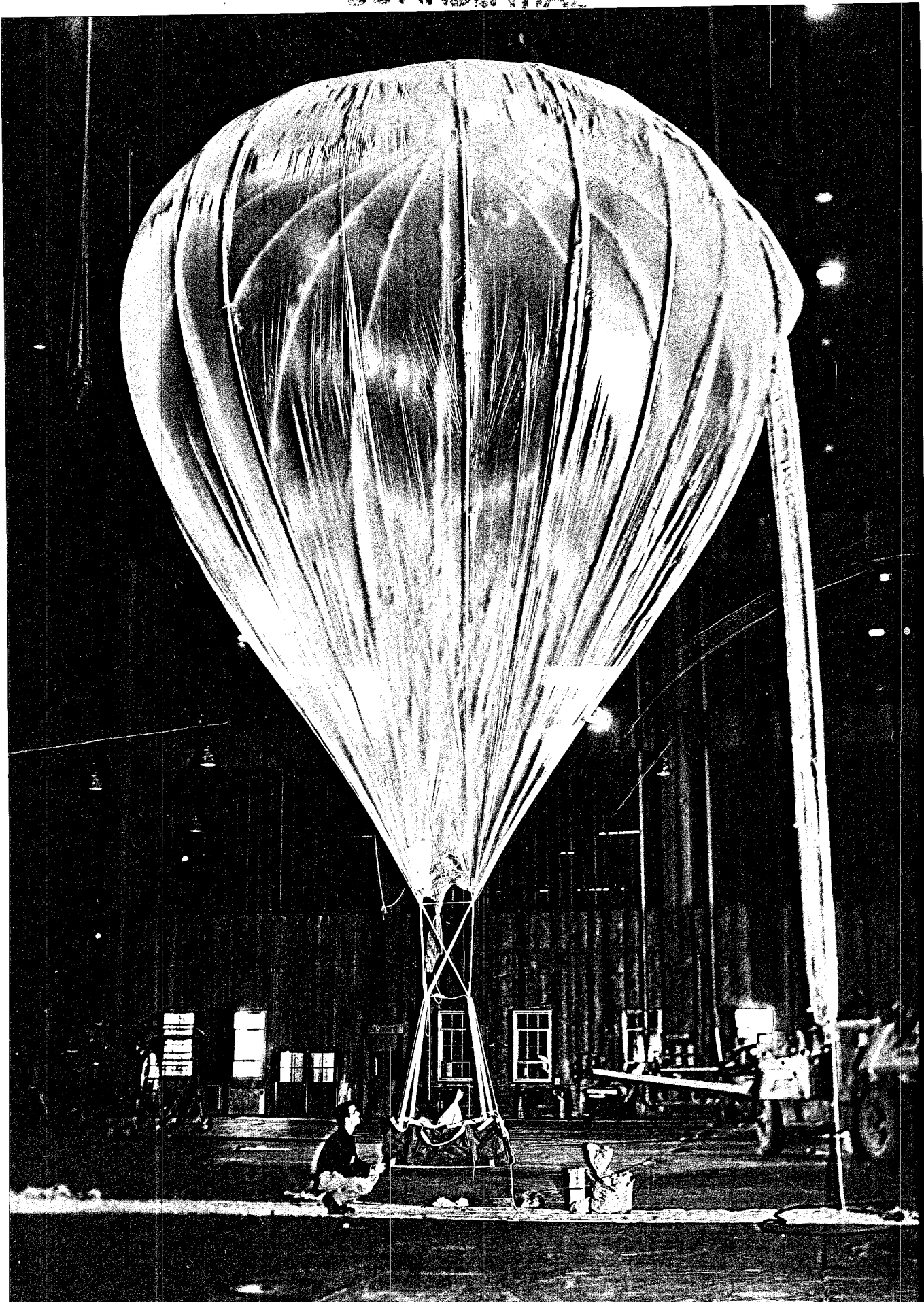
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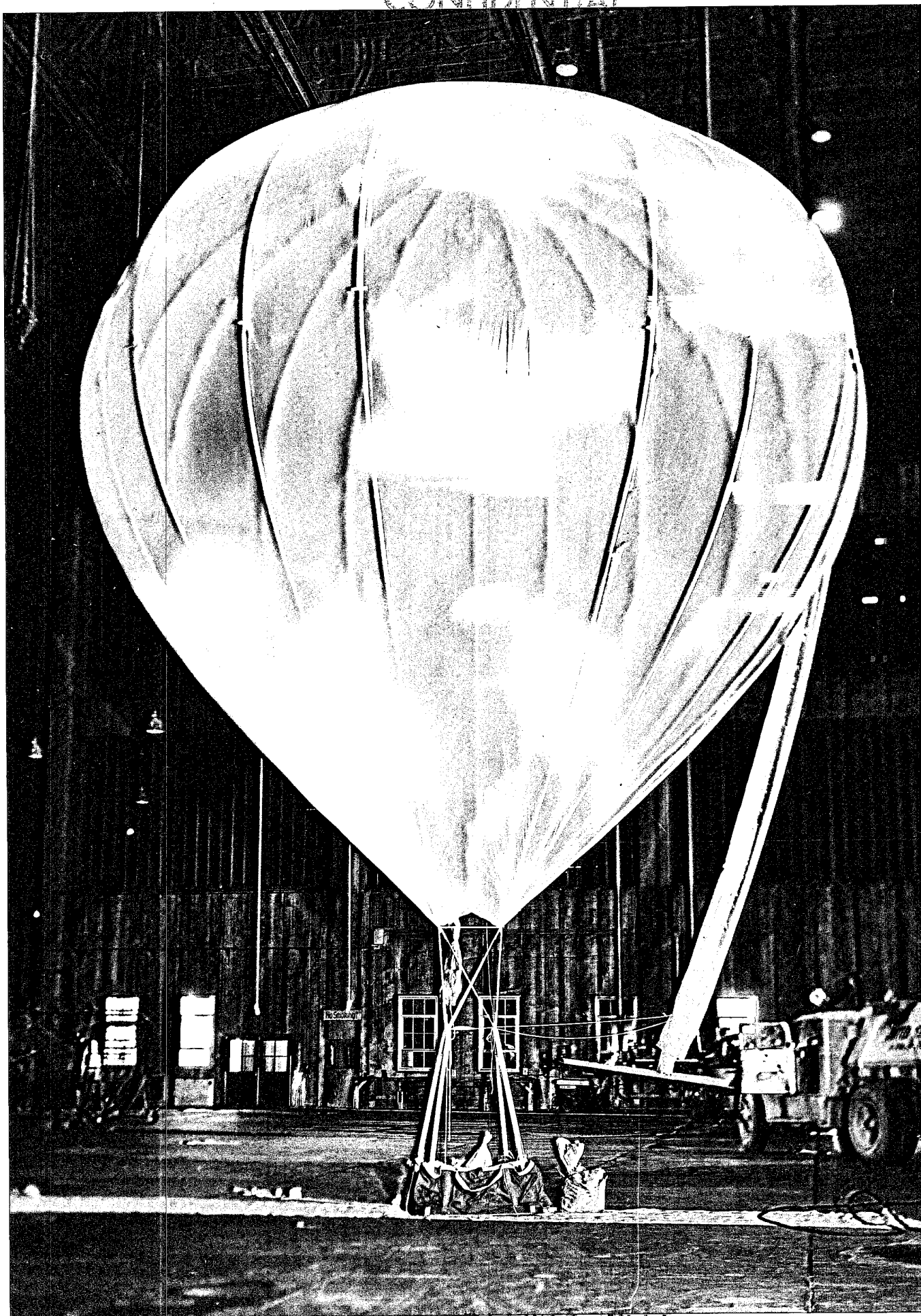
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3. Conclusions and Recommendations

a. Generally, the new design proved very efficient, remaining undamaged under conditions more severe than those expected in flight.

b. It was decided to apply tapes to the wedge gore. This will provide symmetry to load-bearing members on the balloon.

c. The M1 plastic value loss of lift in pounds per minute was consistent in both testing periods at 14 lbs./min.

d. The gross load of 517 pounds, using helium as the lifting gas, confirmed the design volume at 7900 cubic feet.

IV. THE FLIGHT TEST

1. Objectives

A manned balloon flight, GMI #1140, was made on 6 May 1954. Objectives of the flight were as follows:

- a. To flight-test the new 263P balloon.
- b. To determine the flight capabilities of the 263P balloon.
- c. To approve the 263P balloon for production.
- d. To test the hydroneal generator.

2. Details of Testing

The inflation and launching was accomplished without any real difficulty except that it was not possible to meet the time schedule because of difficulties with the hydroneal generator. Surface winds remained less than 5 MPH during most of the period which simplified handling the balloon over the three and one-half hour inflation period.

Take-off was made at 0750 with the balloon rising at 400 F.P.M. to its ceiling of 5000 feet. The flight was characterized by the instability that was evidenced shortly after the balloon had reached its ceiling. The pilot was kept busy riding out the series of up and down drafts. A total ballast of 29 pounds was required to keep the system in a safe altitude range. Total valving time for the four hour duration was only 1 1/4 minutes with the major portion of this being required for landing. Indicative of the instability was the pilot's notation at 1130. "Small brown leaf observed in air near balloon - altitude 3200 feet". The first attempt at a landing resulted in the balloon being caught in a downdraft over a wooded area. The balloon descended into tree tops approximately 10 feet above the base of the balloon. Numerous tears in the balloon were observed. The balloon then rose above the tree and was valved to landing a few minutes later.

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3. Conclusions and Recommendations

a. The 263P balloon withstood a severe test flight and performed excellently under existing conditions.

b. The 263P, as designed, is an acceptable item and ready for production.

c. The hydroneal generator did not produce the 4000 CFH as indicated but gave 3000 CFH, prolonging inflation over 1 1/2 hours.

d. That the hydroneal gas has a distinct ammonia odor was evidenced by the pilot in flight and the crew members during inflation.

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APPENDIX

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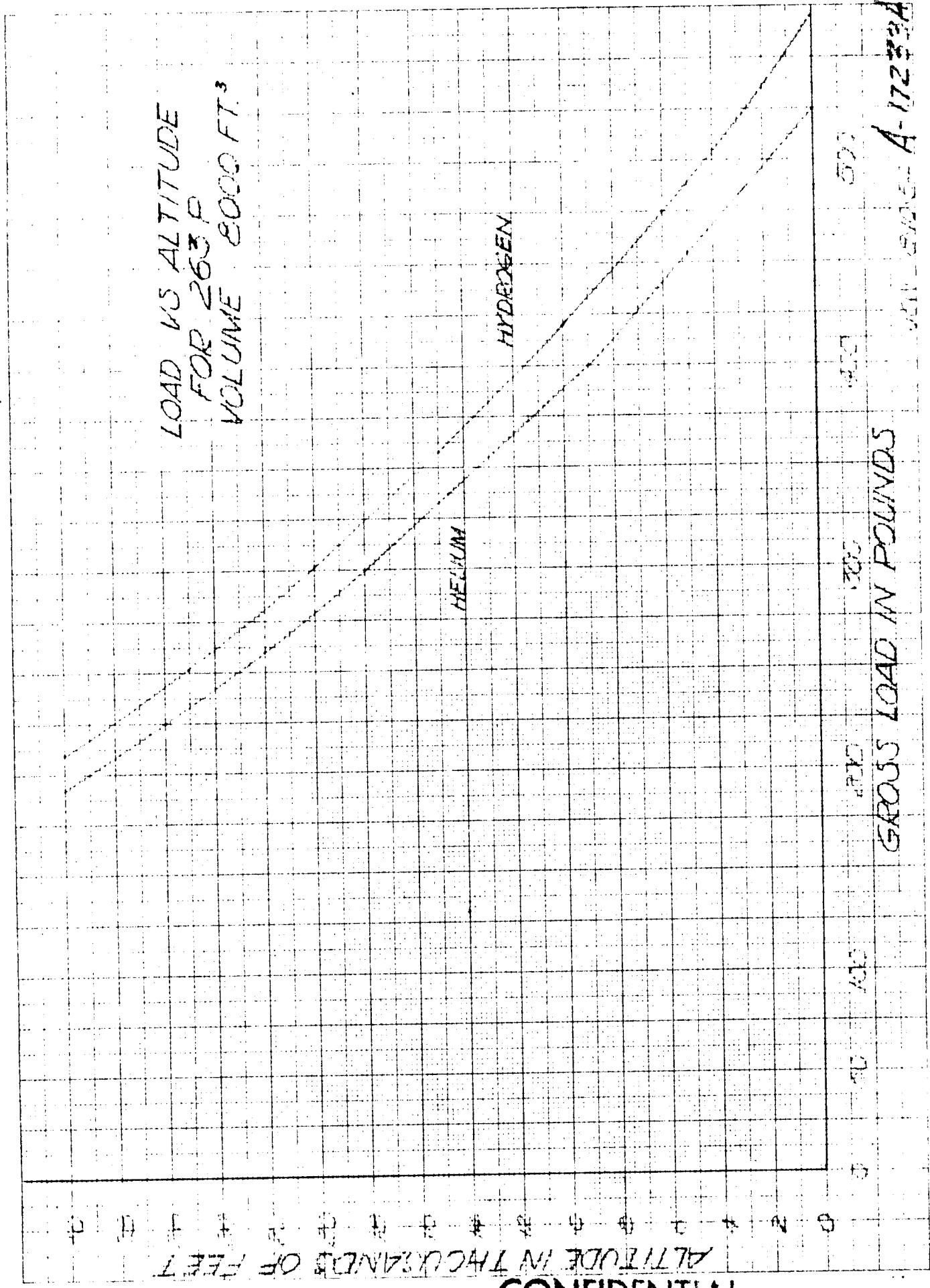
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K-2 10 X 10 TO THE CM 359-14



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263P DRAWINGS

A-15352-B	Inflation Tube and Duct
A-15351-B	Duct Installation
A-15394-B	Reefing Sleeve
A-15350-B	Duct Attachment
A-16596-B	Gore Pattern
A-16749-B	Location of Wedge Gore Tapes
A-16621-C	Valve and Rip Panel Installation
A-17232-C	263P Assembly
A-30004-A	Rip Panel Bolt
A-30005-A	Rip Panel Nut
A-30006-A	Rip Panel Gasket
A-11877-A	Suspension Harness
A-30704-B	Fibre Bushing Installation
A-11876-B	Attachment Pad
A-30708-B	Balloon Base
A-12072-B	Seal thru Balloon Base
A-16883-A	One Way Clip
A-16619-B	Device for Securing Duct
A-16618-C	Rip Device for Balloon Base

Valve Drawings

A-16525-A	Valve Spring
A-16524-A	Stud
A-16523-B	V Seat Mtg. Disk
A-16553-B	Valve Seat
A-16521-C	Valve Plate
A-16554-C	Valve Screen
A-16552-C	Valve Gasket
A-16551-C	Valve Ring
A-16555-C	Valve Assembly

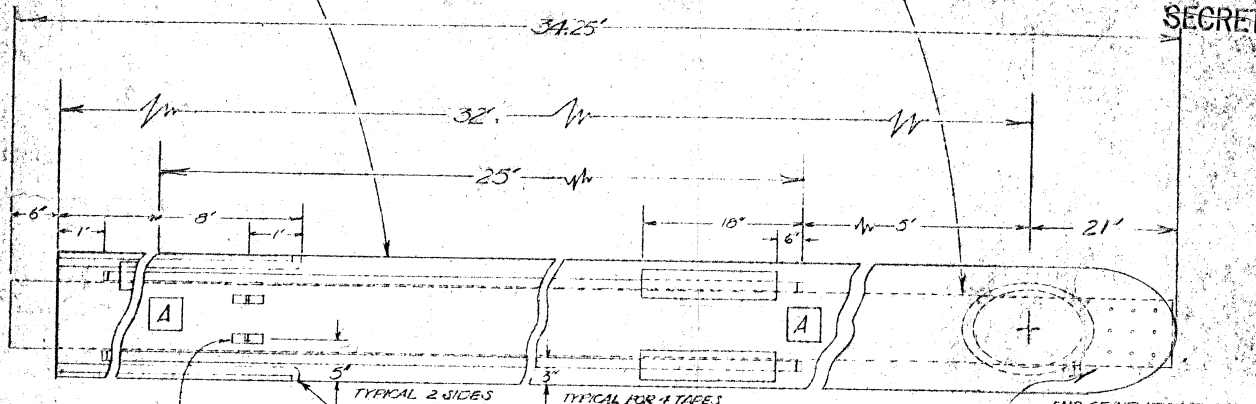
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REVISIONS

OUTER DUCT SHALL BE 33.5 FEET OF
20.6" LAYFLAT 2 1/2 MIL WHITE POLYETHYLENE
TUBING

INNER DUCT SHALL BE 32.5 FEET
OF 3" LAYFLAT 2 1/2 MIL WHITE
POLYETHYLENE TUBING



2 GROMMETS ATTACHED AS
SHOWN ON BALLOON SIDE OF DUCT
10 FEET OF 100" TEST LINE (NOT SHOWN)
SHALL BE TIED TO EACH GROMMET

GLASS FIBRE EMBEDDED
POLYETHYLENE TAPE HEAT SEALED
ON INSIDE OF DUCT. CONTINUOUS
STRANDS UP AND DOWN

SMALL TUBE HEAT SEALED
DOWN CENTERLINE (ON BALLOON
SIDE OF DUCT) WITH VERTRODE
SEALER TO LARGE TUBE EVERY
10" FOR 10" OVER THE 31" AREA ABOVE
1" POLYETHYLENE TAPE PLACED OVER
ENDS OF SEAL 2 PLACES DENOTED
BY 'A'

END OF INFLATION TUBE
HEAT SEALED. 18 3/4" HOLES
IN LAST 12 INCHES

NOTE:
NO ROLL HEAT SEAL ON
DUCT EXCEPT FOR SEALING
FIBRE EMBEDDED TAPE

DUCT MATERIAL

HEAT SEAL OR CREASE

DETAIL OF TAPE ENDS TYPICAL 3 PLACES

2" POLYETHYLENE TAPE

FIBRE BUSHING AND TAPE LOOP

ADD TAPE BROUGHT
BACK TO ADHESIVE TO
ADHESIVE

EXCEPT AS NOTED, TOLERANCES .01 INCHES

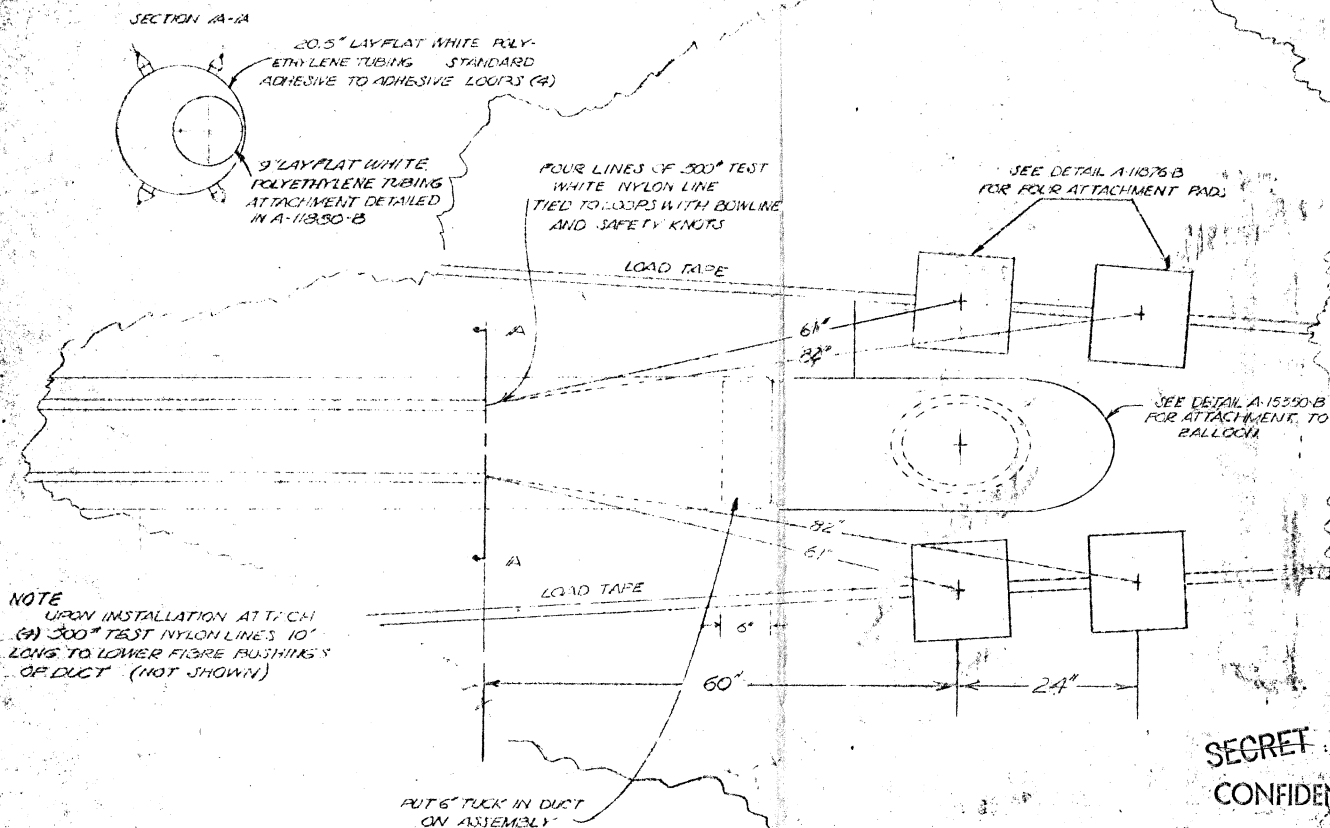
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DATE	BY	REVIEW	DATE
10/1/54	WJH	WJH	10/1/54
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10/1/54	WJH	WJH	10/1/54
10/1/54	WJH	WJH	10/1/54
10/1/54	WJH	WJH	10/1/54
10/1/54	WJH	WJH	10/1/54
10/1/54	WJH	WJH	10/1/54
10/1/54	WJH	WJH	10/1/54
10/1/54	WJH	WJH	10/1/54

INFLATION
TUBE & DUCT

A-1552B

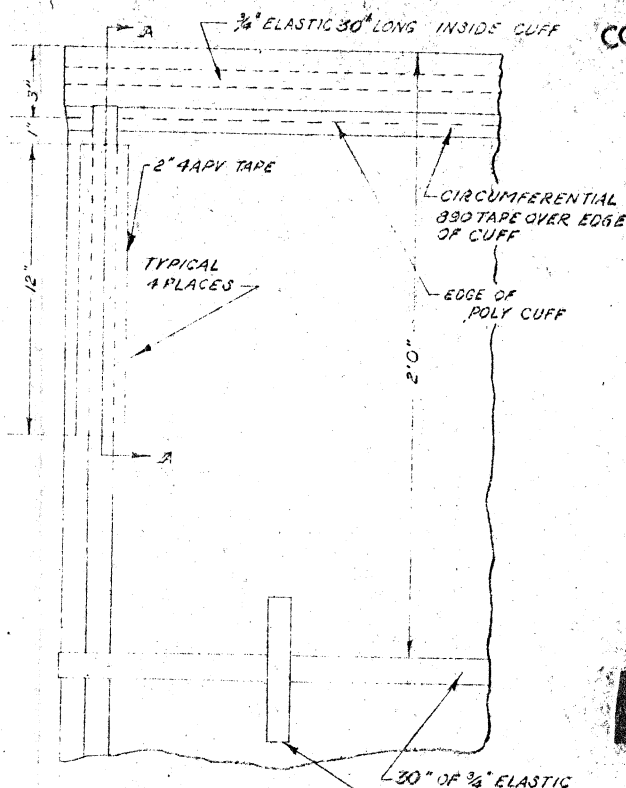
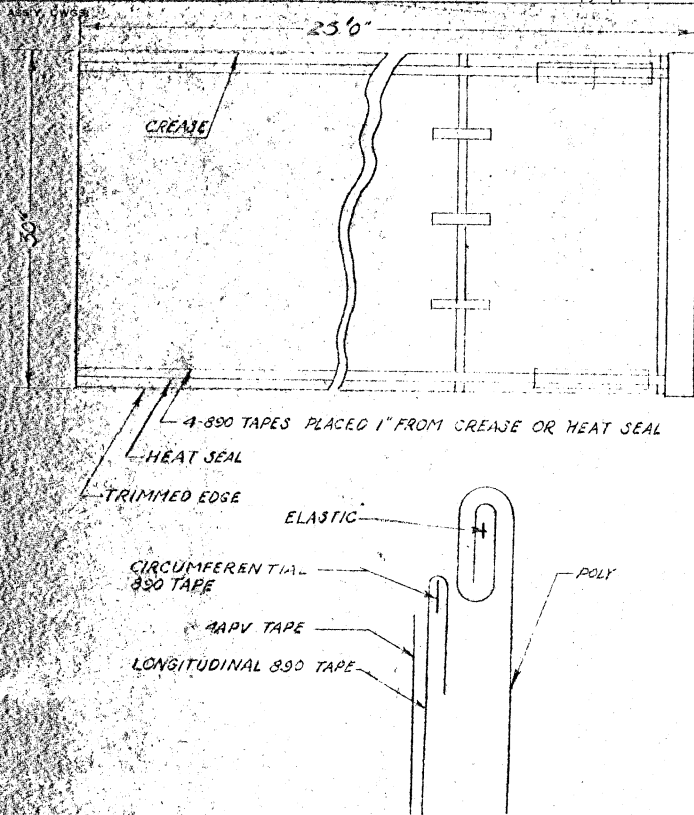
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OCT 1 1954

DATE SPEC	
BY UCW	APPROVED
DATE 2-26-54	DATE
NAME	
DUCT INSTALLATION	
A15351-B	



REVISIONS
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OCT 1 1984

MATERIAL SPEC	
3/4" POLYETHYLENE	
30 LAY FLAT TUBING	
DR. JCW	MR. HEF
CH. JCW	APR
DATE 2-3-51	SCALE 1/4"
NAME	
REPAIRING SLEEVES	
A-15394B	

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HEAT SEAL DUCT TO BALLOON
WITH 3"x2" LONG VERTRODE
SEAL SEGMENTS ON THIS
CIRCUMFERENCE. NO VOIDS IN
THE SEAL CAN BE TOLERATED.

HEAT SEAL 3" WIDE
GLASS FIBRE EMBEDDED
POLYETHYLENE FILAMENT
TAPE TO THE BALLOON IN THIS AREA
WITH ROLL HEAT SEALER

1" WIDE BY 2" LONG
POLYETHYLENE TAPE
OVER HEAT SEAL OF
DUCT TO BALLOON

OPENING IN BALLOON AND DUCT

NOTE
HOLE TO BE LOCATED 13 FEET FROM
TOP OF BALLOON MIDWAY BETWEEN
LOAD TAPES ON GORE AS SHOWN ON
DRAWING NO. 1A

EXCEPT AS NOTED ALL
TOLERANCES ±.1 EACH

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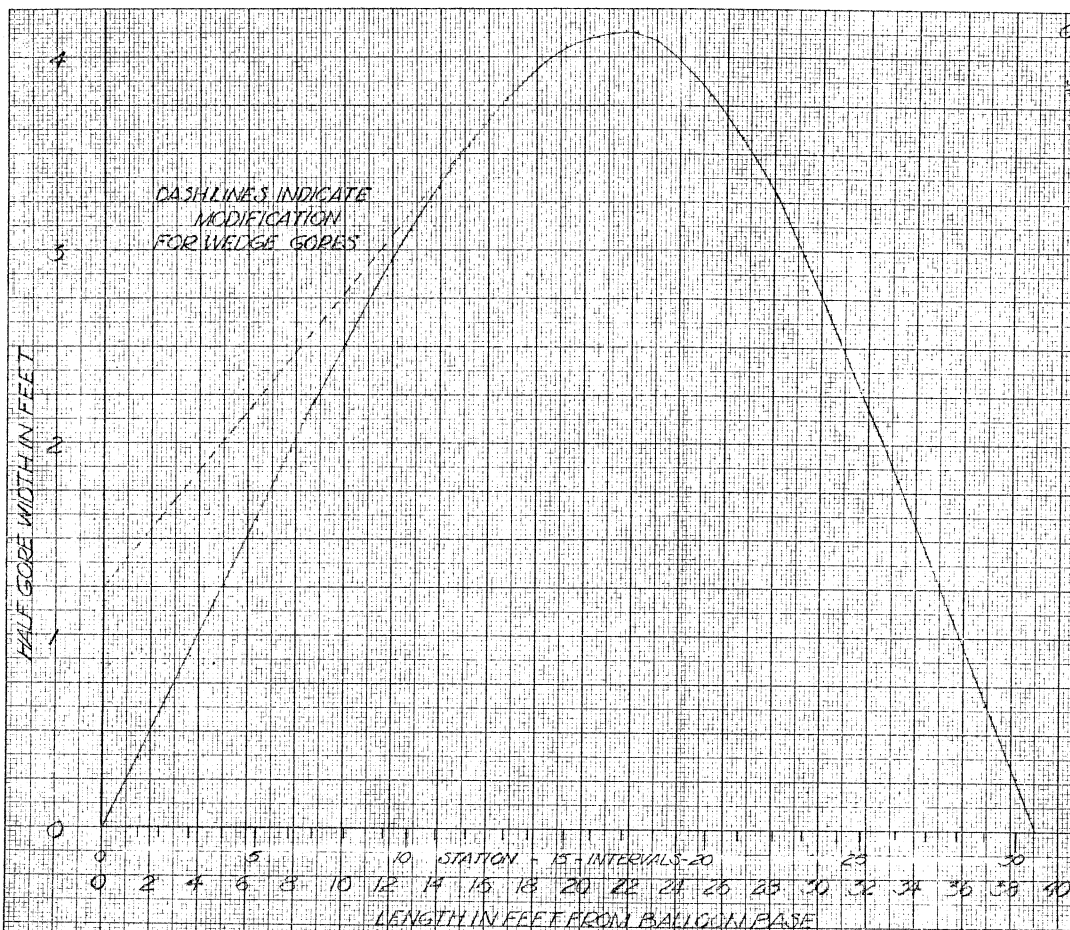
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CA 15350-B

CONFIDENTIALCORE PATTERN FOR 263P
WITH WEDGE CORE

STATION	DIST. IN FEET	EGW IN FT.
1	1.4587	0.3663
2	2.4024	0.6016
3	3.6274	0.9054
4	5.0637	1.2632
5	6.3253	1.5977
6	7.9073	1.9616
7	8.8536	2.2149
8	10.0289	2.5231
9	11.7117	2.8756
10	12.8310	3.1096
11	13.9425	3.3326
12	15.0391	3.5324
13	16.7905	3.7221
14	17.3152	3.9123
15	19.3089	4.0616
16	20.3702	4.1155
17	21.6340	4.1351
18	23.0236	4.0837
19	24.0531	3.9900
20	25.3151	3.8117
21	26.6721	3.5336
22	28.0373	3.2070
23	29.3134	2.9259
24	30.3412	2.5407
25	31.1594	2.2550
26	32.2531	1.8047
27	34.4623	1.4212
28	35.7435	1.0087
29	36.8552	0.6592
30	38.2580	0.2585
31	39.0200	0

**SECRET**A-16590-B
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JCH

OCT 1 1954

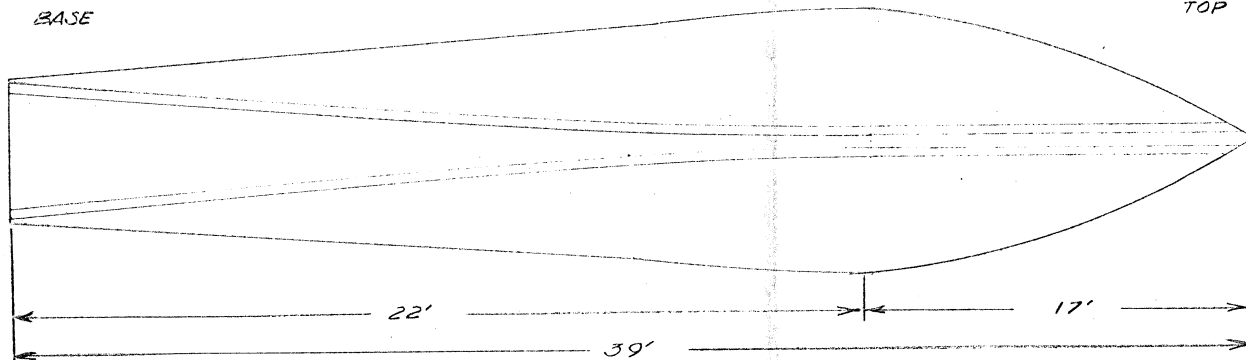
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BASE

EQUATOR

TOP



TWO 890 LOAD TAPE'S TAPER TOWARDS
CENTER OF WEDGE GORE AT THE BALLOON
EQUATOR THEN STRAIGHT TO TOP OF BALLOON

CONFIDENTIAL NOTED

SECRET

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MAT'L SPEC.

DR. JCW APP.

CH. APP.

DATE 8/9/54 SCALE 1/32

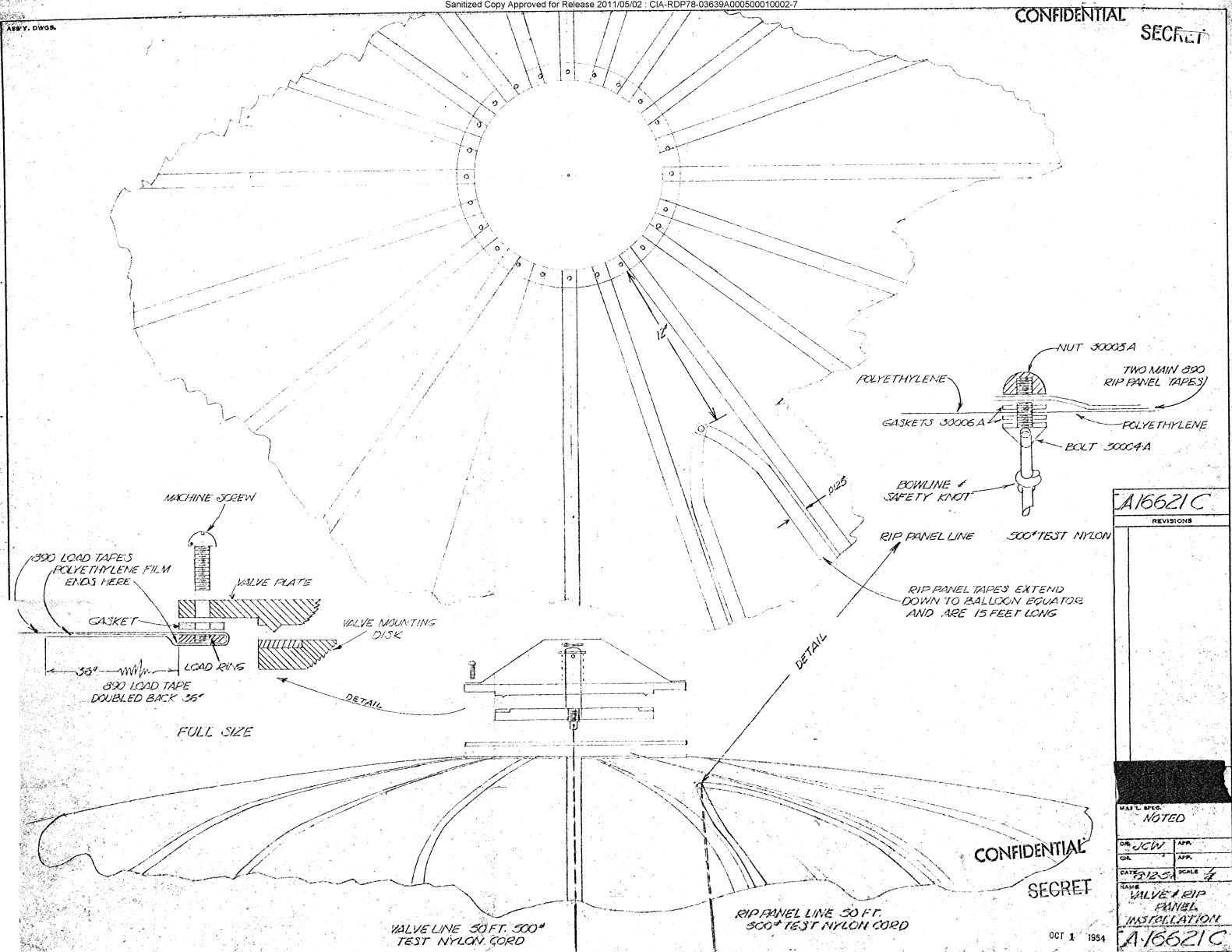
NAME

LOCATION OF
WEDGE GORE TAPE

A16749B

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ASBY, DWGS.



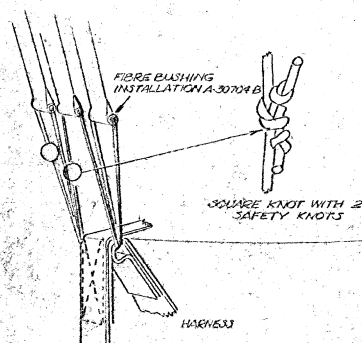
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LIST OF COMPONENTS			
ITEM	NAME	DR. NO.	REQ'D
1	PLASTIC GORES	A-16598	10
2	LOAD TAPES	-	22
3	DUCT INSTALLATION	A-15351	1
4	ATTACHMENT PAD	A-11876	4
5	PLASTIC VALVE	A-16335	1
6	LOCATION OF WEDGE	A-16749	-
7	GORE TAPES	-	-
8	RIP PANEL	A-16621	1
9	HARNESS	A-11877	1
10	BALLOON BASE	A-30108	1
10	RAIN DEFLECTOR	-	1

NOTE: 500 LB. NYLON LINE THROUGH 2 BUSHINGS / HARNESS EXCEPT CENTER LOAD TAPE. THERE, THE 500 LB. NYLON LINE CONNECTS WITH HARNESS & LOAD TAPE

NYLON LINES TO BE 42" LONG (34" DEVELOPED LENGTH) OF 500 LB. TEST NYLON EXCEPT FOR 2 CENTER LINES THAT WILL BE 48" LONG (19" DEVELOPED LENGTH)



DUCT / INFLATION TUBE
A-15332-B

10' OF 300* TEST NYLON LINE
TIED TO EACH DUCT TAPE
FURNISHED ON BALLOON

VALVE LINE 45' OF 500*
TEST NYLON CORD

RAIN DEFLECTOR - ONE MIL
POLYETHYLENE FILM 35"x
10" ATTACH WITH 2" WIDE
POLYETHYLENE TAPE

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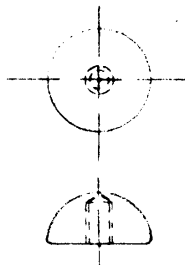
OCT 1 1954

A-17232C	
REVISIONS	
EXCEPT AS NOTED ALL TOLERANCES IN INCHES GENERAL MILITARY MECHANICAL ENGINEERING PRACTICE AND DEVELOPMENT DEPT. MACHINING SPECIFICATIONS APPLY	
NOTED	
DR. JCW	APP.
CHK.	APP.
DATE: 9-30-54	SCALE: 1" = 3'
NAME: 265P ASSEMBLY	
A-17232C	

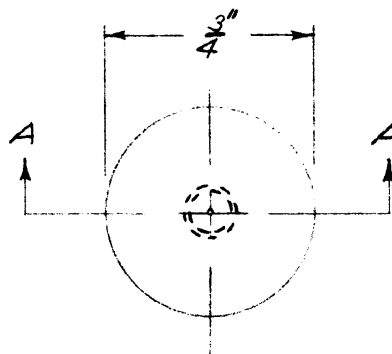


IF NOT SPECIFIED TOLERANCES ARE:
 ±.001" IF 3 DECIMAL FIGURES ARE GIVEN
 ±.01" IF 2 DECIMAL FIGURES ARE GIVEN
 ±.1" IF 1 DECIMAL FIGURE IS GIVEN

DR. <i>DICK</i>	APP. <i>E</i>	SCALE <i>DOUBLE</i>	MAT. <i>ALUMINUM</i>	NO. SHEETS <i>ONE</i>	DRAWING <i>RIP PANEL CORD ATTACHMENT BOLT</i>	<i>A-30004-A</i>
CH.	APP. <i>HEF</i>	DATE <i>9-27-51</i>	MAT. SPEC. <i>24ST</i>	<i>J-17H</i>		



ACTUAL SIZE



POLISH FINISH
ROUND ALL EDGES



DRILL #21 (.159) AS SHOWN
BOTTOM TAP #10-32 NF

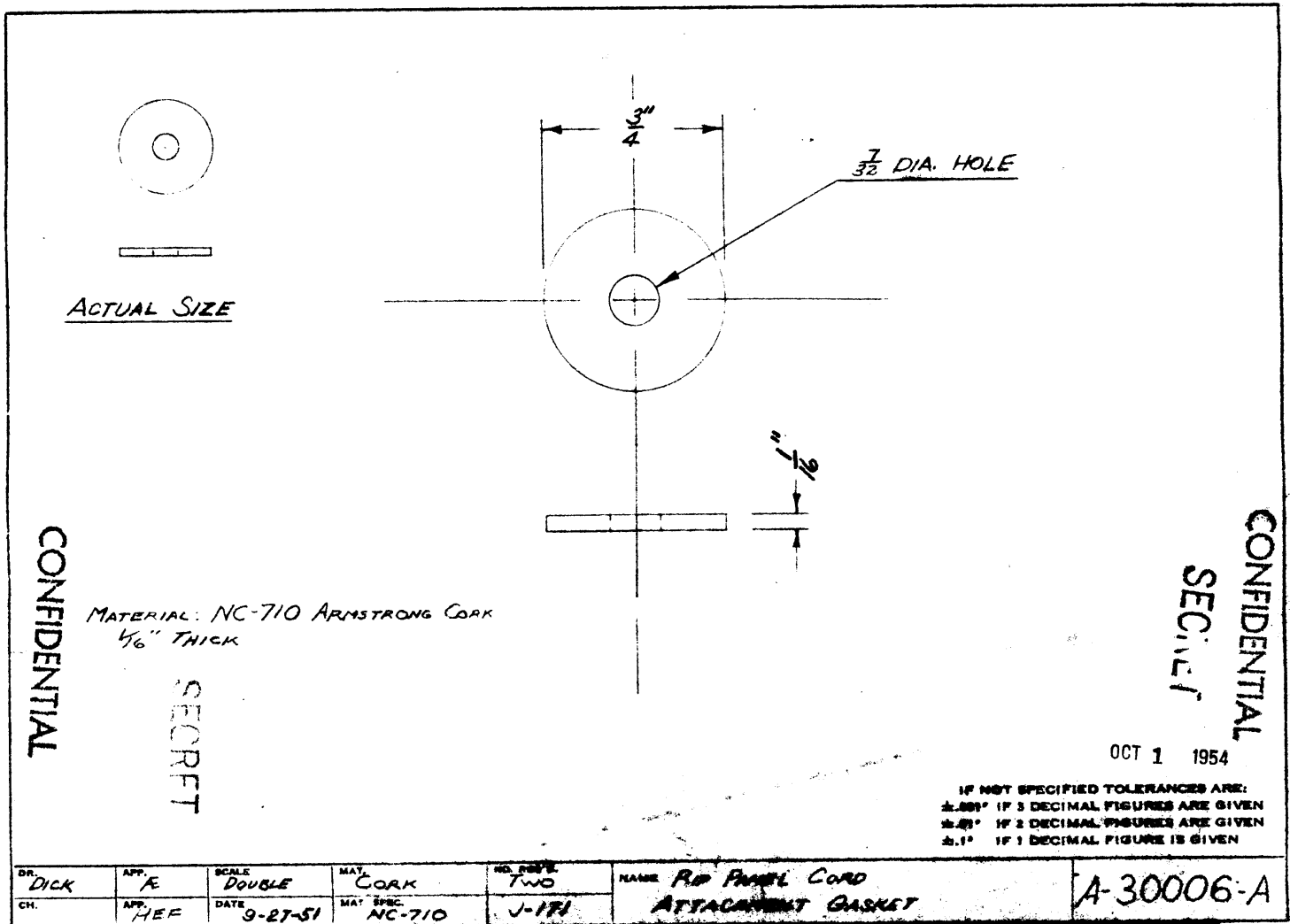
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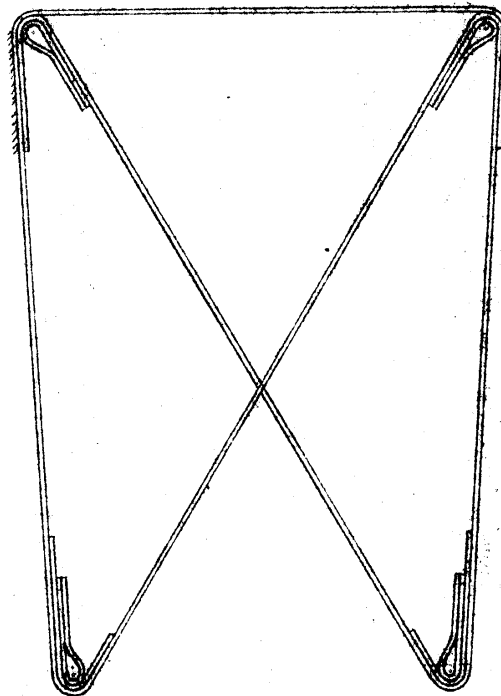
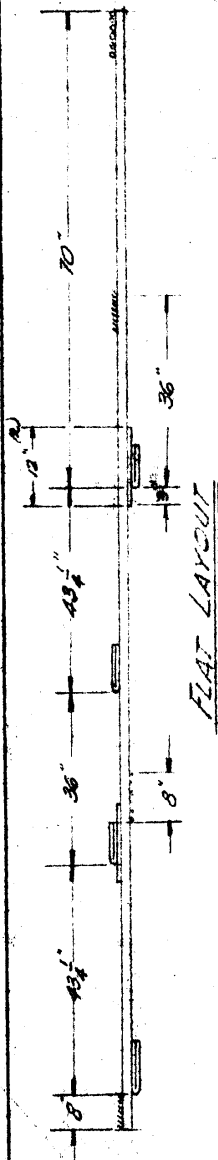
IF NOT SPECIFIED TOLERANCES ARE:
±.001" IF 3 DECIMAL FIGURES ARE GIVEN
±.01" IF 2 DECIMAL FIGURES ARE GIVEN
±.1" IF 1 DECIMAL FIGURE IS GIVEN

DR. <u>DICK</u>	APP. <u>K</u>	SCALE <u>DOUBLE</u>	MAT. <u>ALUMINUM</u>	NO. REQ'D. <u>ONE</u>	NAME <u>RIP PANEL CORD</u>	<u>A-30005-A</u>
CHK. <u>HEF</u>	APP. <u>HEF</u>	DATE <u>9-27-51</u>	MAT. SPEC. <u>24ST</u>	<u>J-171</u>	<u>ATTACHMENT NUT</u>	

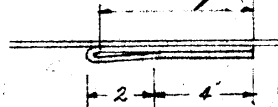


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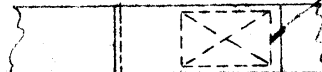
NOTE: MATERIAL SHALL BE 1500 LB.
TEST (OR BETTER) $1\frac{1}{2}$ " WOVEN
WEBBING. 12' REQUIRED



SEW THIS PORTION OF STRAP FIRST
& THEN MAKE LOOP (USING
NO. 6 COTTON CORD)



SEW THIS PATTERN WITH
NO. 6 COTTON CORD



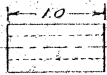
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DETAIL OF EYE ATTACHMENTS

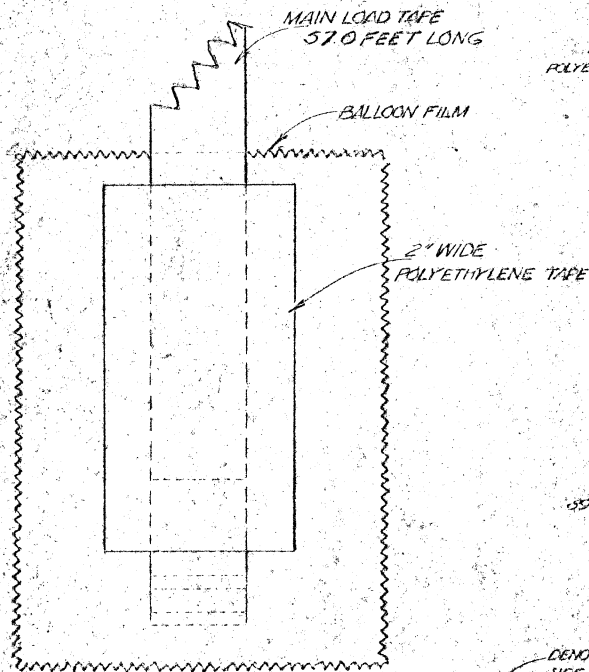
OCT 1 1954

DR	GT	DATE	21-20-54	NAME	302 P SUSPENSION HARNESS	A-11877-A
APP	HEF	DEALS				

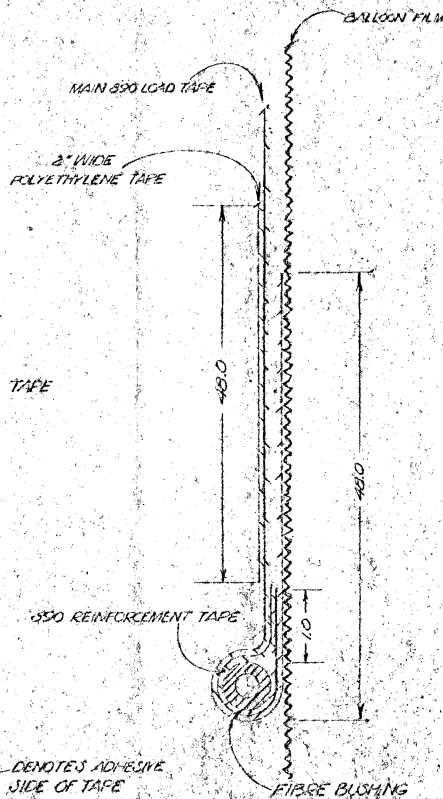
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ROUND OFF ALL EDGES
OF BUSHING



FRONT VIEW



DENOTES ADHESIVE
SIDE OF TAPE

FIBRE BUSHING

NOTE: CENTER OF FIBRE
BUSHING TO BE LOCATED
3" FROM BASE OF
BALLOON

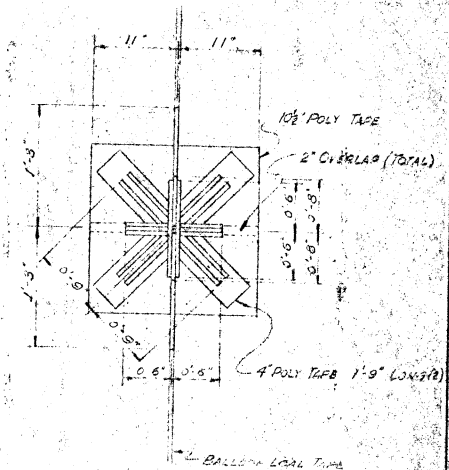
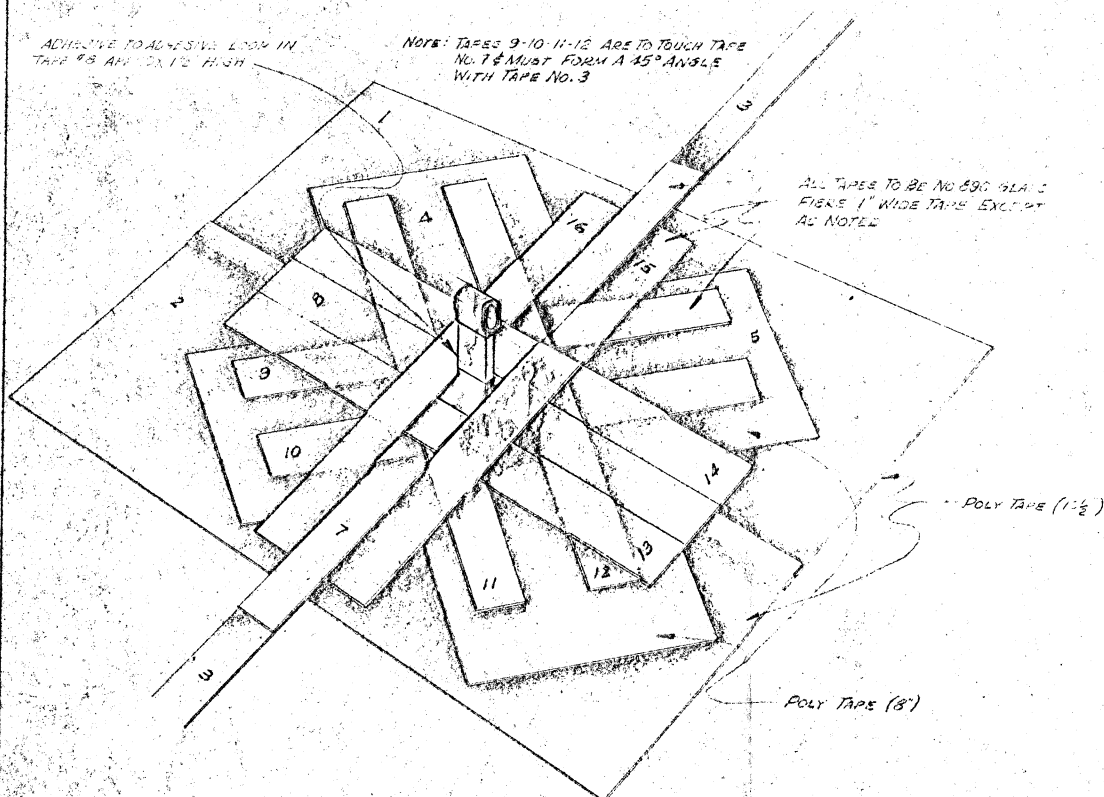
SECRET

CONFIDENTIAL

DR. JCW	APP. HEM
CH. HEM	APP.
DATE 5-5-53	SCALE
NAME	
FIBRE BUSHING INSTALLATION	
A 30704-B	

OCT 1 1954

SECRET CONFIDENTIAL



SECRET CONFIDENTIAL

CR - THOMPSON
APP - 116F

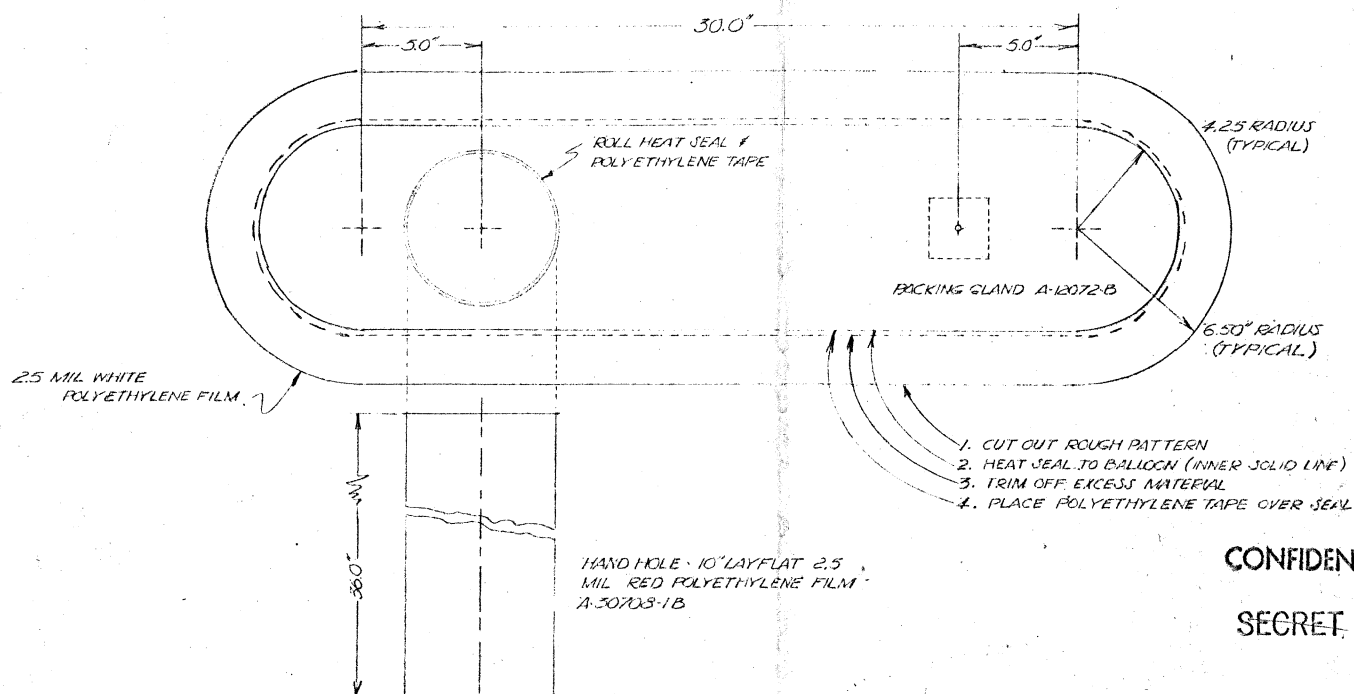
ATTACHMENT PAD

OCT 1 1954
A-11376

ASTY. DWGS.

REVISIONS

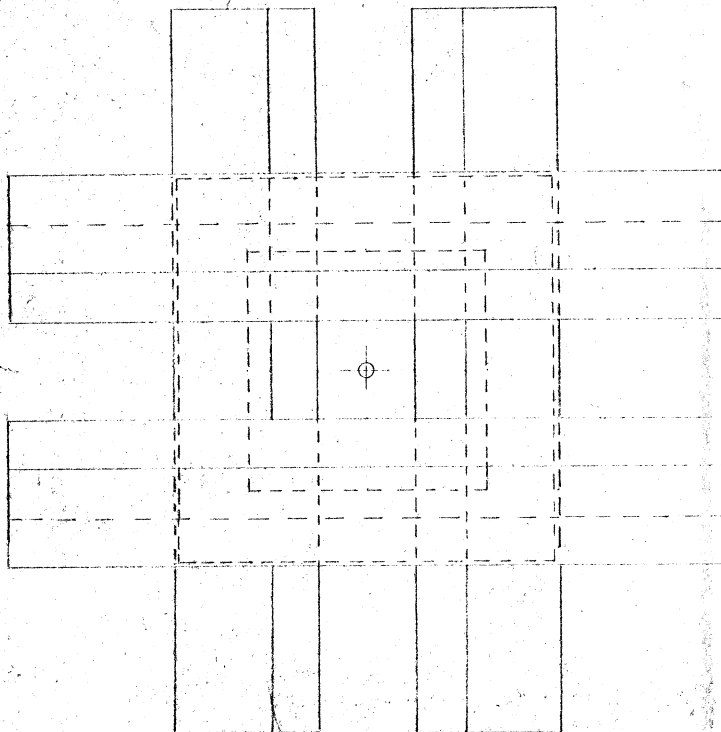
CONFIDENTIAL
SECRET



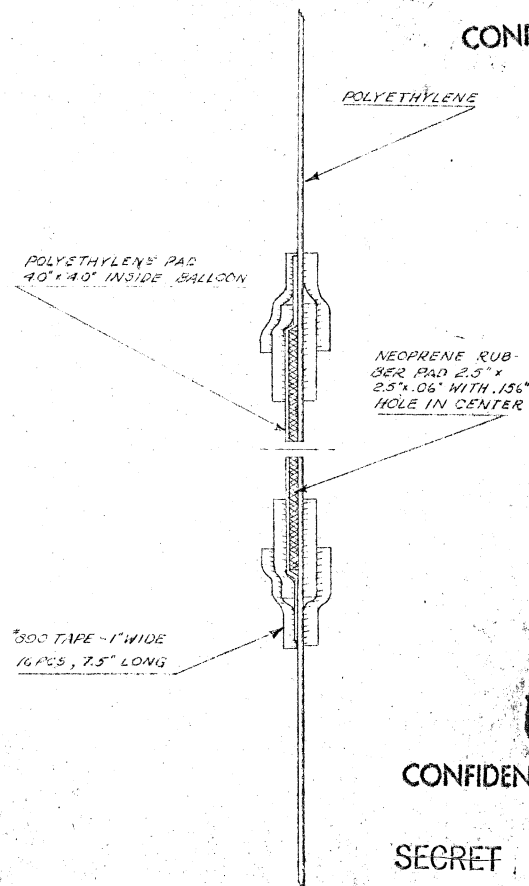
CONFIDENTIAL
SECRET

OCT 1 1954

MATERIAL SPECIFIED	
DR. JCW	APP. HEF
CH. HEF	APP.
DATE 5-27-53	SCALE 1/4"
NAME	
BALLOON BASE	
A-30703-B	



NOTE: A SMALL HOLE SHOULD BE PIERCED THRU POLY MATERIAL IN LINE WITH HOLE IN NEOPRENE PAD BEFORE CORD (300 POUND TEST RED NYLON LINE) IS INSERTED.



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CONFIDENTIAL NOTED

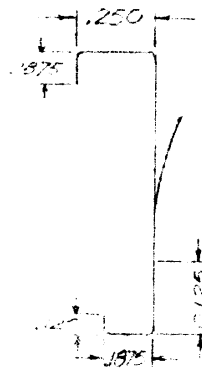
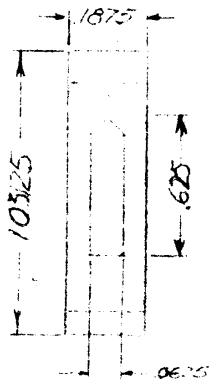
SECRET

OCT 1 1951

REVISIONS	
DATE	SCALE
5-53	FULL
NAME	
SEAL THRU BAL- LOON ENVELOPE	
A-12072-B	

A16883A

ASS'Y. DWGS



CONFIDENTIAL
SECRET

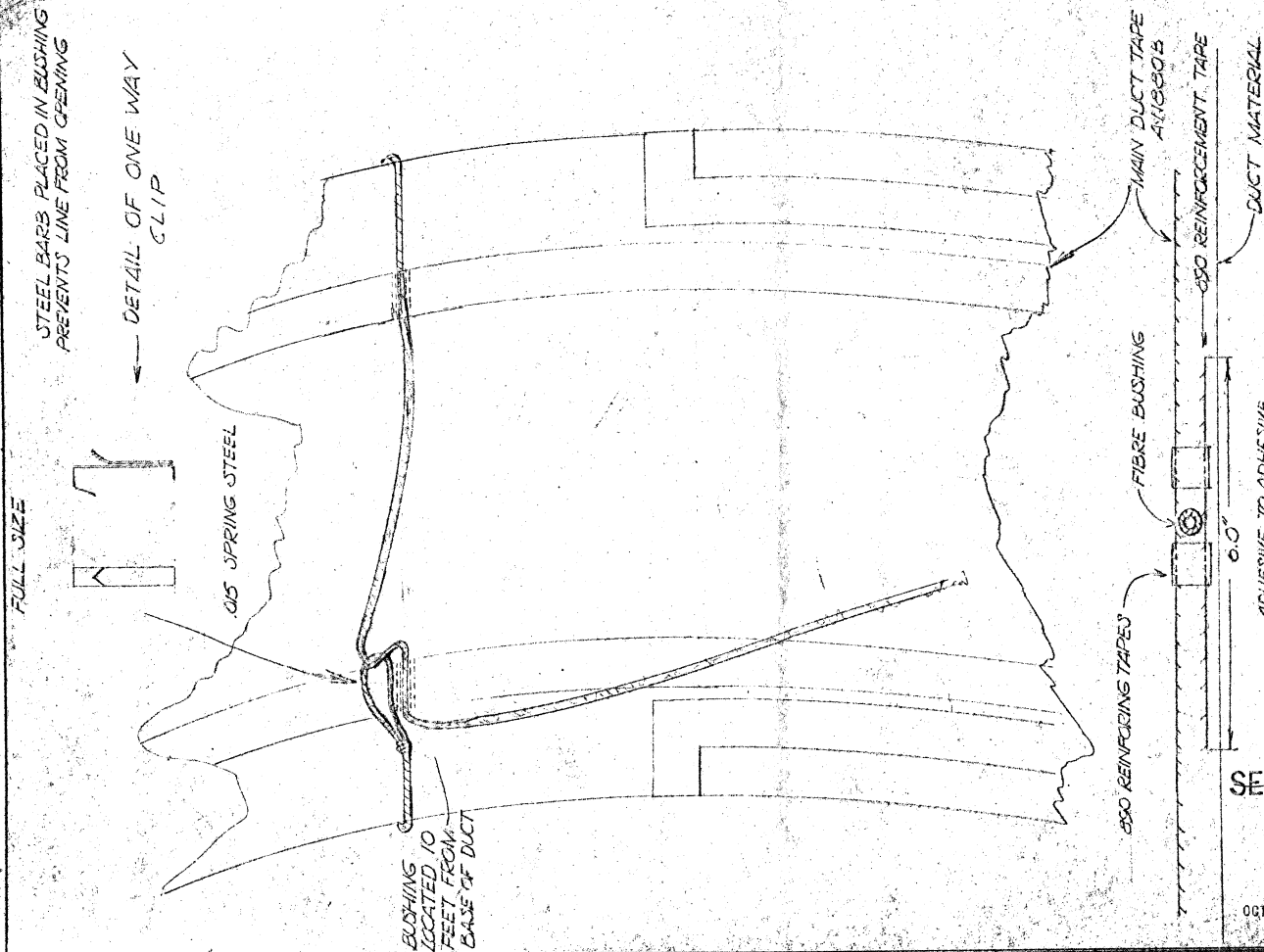
CONFIDENTIAL

SECRET

OCT 1 1954

REVISIONS	
[REDACTED]	
MATERIAL SPEC.	
015 SPRING STEEL	
DR.	APP.
CH.	APP.
DATE	SCALE
08-11-54	NONE
NAME	
ONE WAY CLIP	
A16883A	

ASSY. DWGS.



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SECRET

A16619-B

REVISIONS

NO.	DATE	BY	REVISIONS
1	26 SEP 54	HEE	NOTED

CONFIDENTIAL

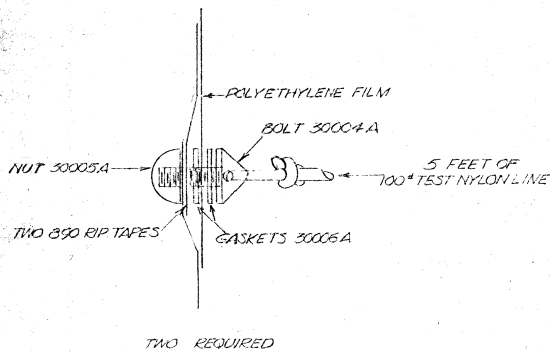
SECRET

DR. JCW	APP. HEF
CH. HEF	APP.
DATE 26 SEP 54	SCALE NONE
NAME	
DEVICE FOR SECURING DUCT	

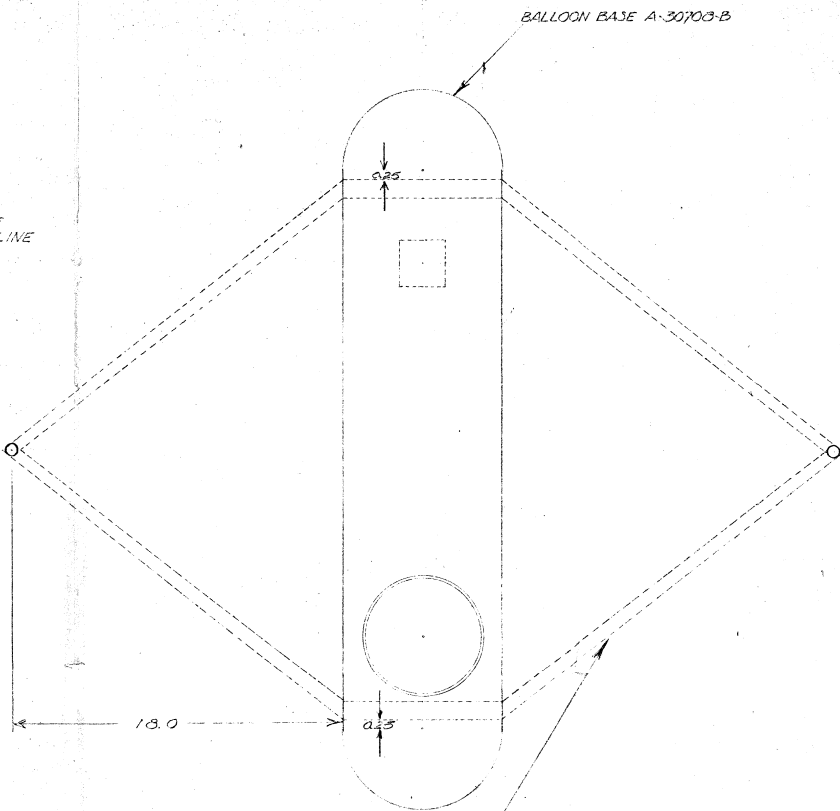
A16619-B

OCT 1 1954

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SECRET



DETAIL



TWO 890 RIP TAPES DEVELOPED
LENGTH 55.5 INCHES

VIEW SHOWS HOW TAPES APPEAR ON INFLATED BALLOON

A-16618C

REVISIONS

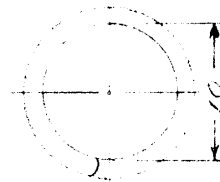
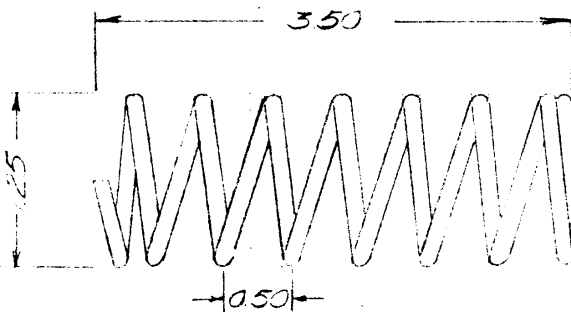
DATE SPEC		NOTED	
DR.	JCW	APP.	NEP
CHK.		APP.	
DATE	5/17/54	SCALE	1/1
NAME			
RIP DEVICE FOR BALLOON BASE			
A-16618C			

CONFIDENTIAL
SECRET

OCT 1 1954

A-16525 A

ASS'Y. DWGS.



SPRING DATA

WIRE DIAMETER 0.125
 SPRING CONSTANT 30 LB/INCH
 NO. OF ACTIVE COILS 7
 ENDS GROUND & SQUARED

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REVISIONS

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 SECRET

MAT'L SPEC
 CADMIUM
 PLATED WIRE

DR. JCW APP. HEF

CH. HEF APP.

DATE 8-3-54 SCALE FULL

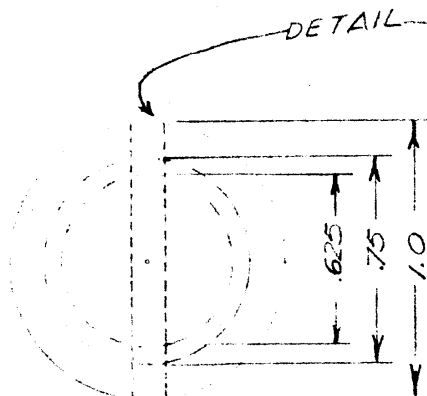
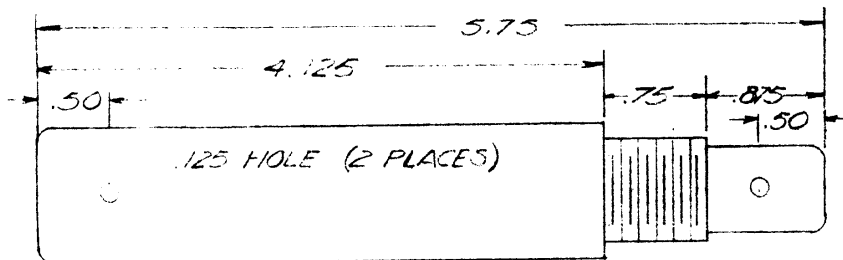
NAME
 MS. VALVE
 SPR. 16

A-16525 A

OCT 1 1954

A16524 A

ASS'Y. DWGS.



DOUBLE SIZE

SECRET
CONFIDENTIAL

MAT'L SPEC.	
1" LINEN MICARTA ROD	
DR. JCW	APP. HEF
CH. HEF	APP.
DATE 8-2-54	SCALE FULL
NAME	
STUD FOR M3 VALVE	

OCT 1 1954

A16524 A

SECRET
CONFIDENTIAL

ASS'Y. DWGS.

REVISIONS

CONFIDENTIAL
SECRET

10.25 D

TAPPED 0.75-16

0.50
LINEN IMCARTA

5.125
4.375

.125

CONFIDENTIAL NOTED

SECRET

MAT'L SPEC.

DR. JCW APP. HEF

CH. HEF APP.

DATE 02-54 SCALE FULL

NAME M3

VALVE SEAT

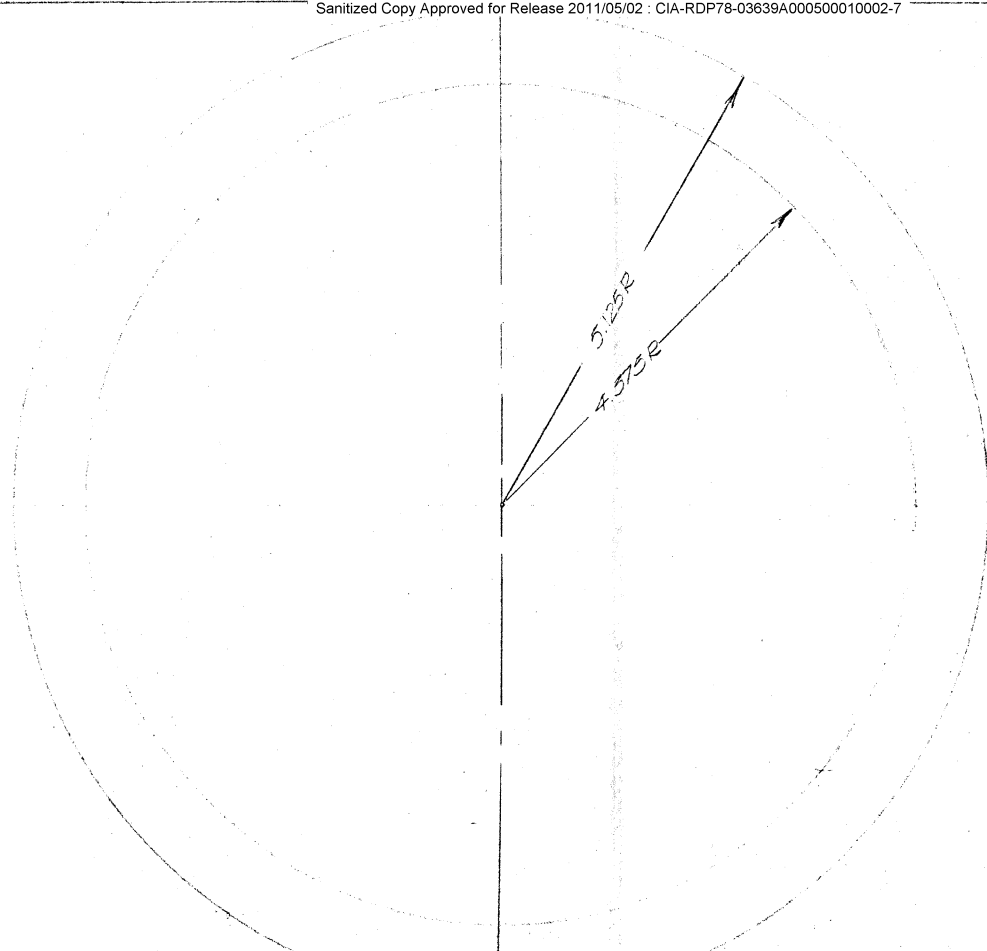
MOUNTING DISK

A16523B

OCT 1 1954

ASSY. DWG.

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SECRET

MATERIAL SPEC.	
.125 THICK 80D CLOSED CELL NEO.	
DR.	JCW
CH.	
DATE	8-54
SCALE	FULL
NAME	
VALVE SEAT	

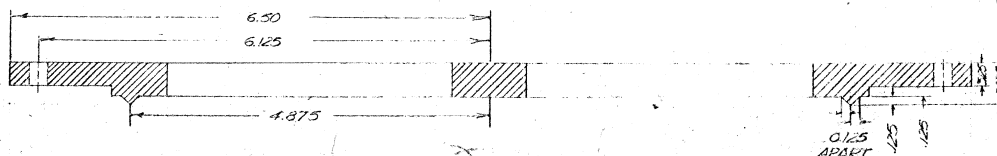
SECRET
CONFIDENTIAL

OCT 1 1954

116553B

Sanitized Copy Approved for Release 2011/05/02 : CIA-RDP78-03639A000500010002-7

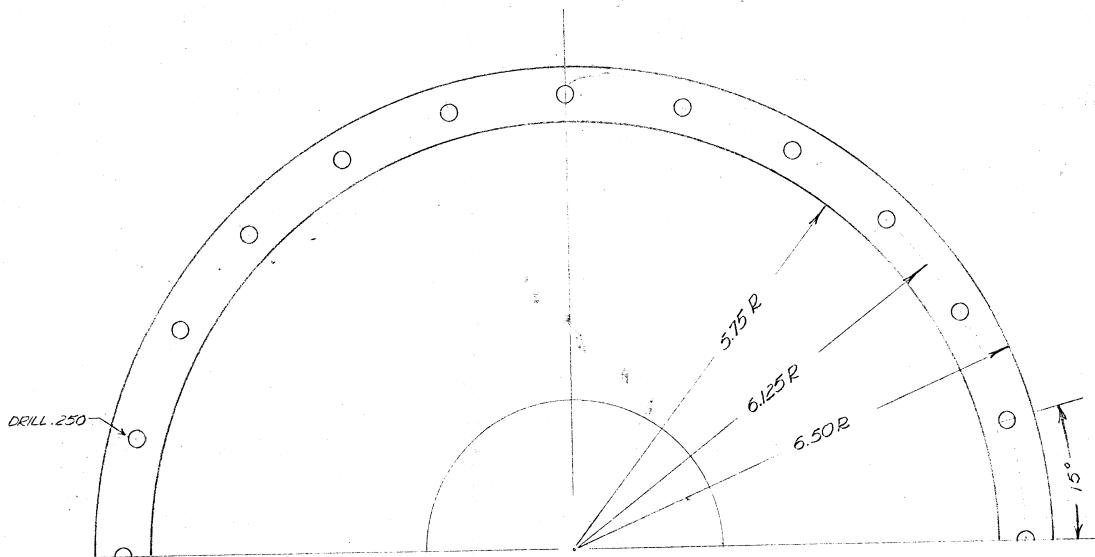
LA 16521-C



OCT 1 1954

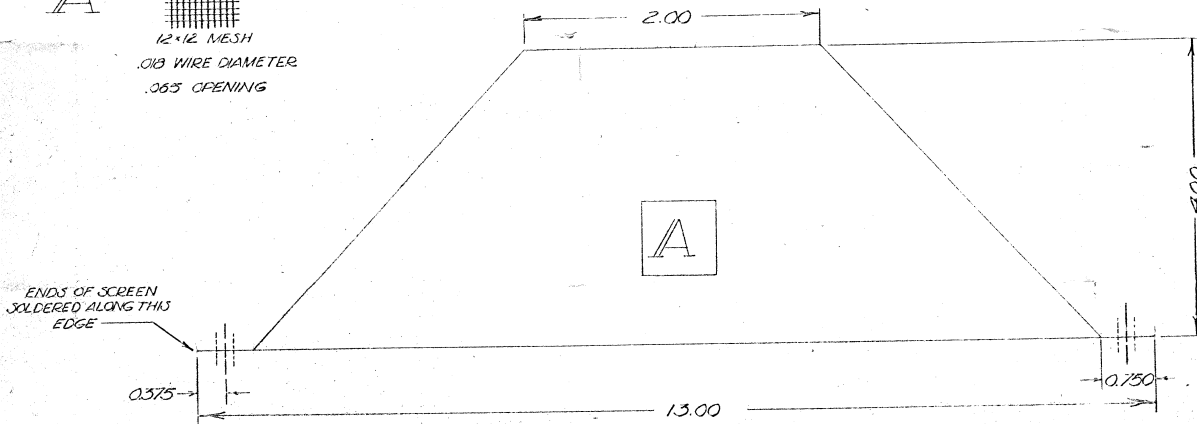
CONFIDENTIAL
SECRET

ASBY, DWG.



A

12x12 MESH
.013 WIRE DIAMETER
.065 OPENING



CONFIDENTIAL
SECRET

OCT 1 1954

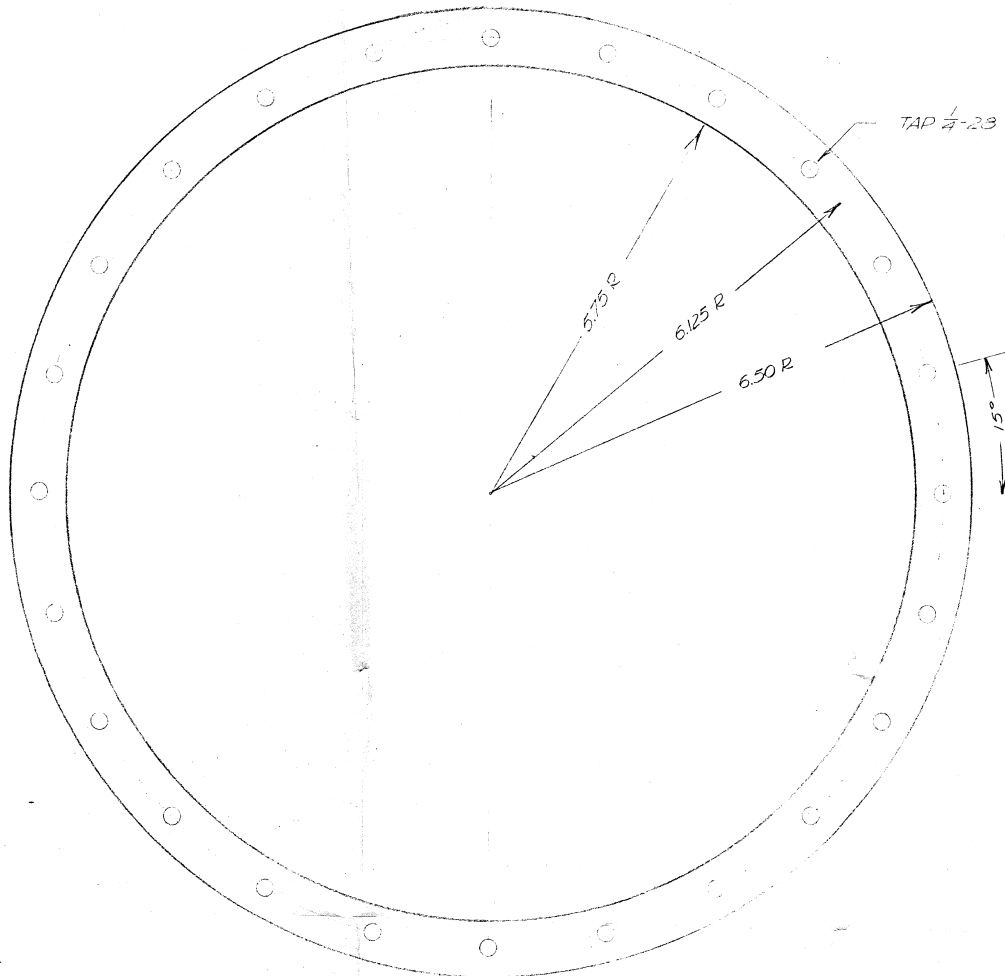
A-16554C	
REVISIONS	
NOTED	
DR. JCW	APP.
CHE	APP.
DATE 9-25-54	FILE FULL
NAME	
M3 VALVE SCREEN	
A-16554C	

Technical drawing of a circular plate with 24 holes. The plate has an outer diameter of 15 inches. The holes are arranged in a circular pattern. The distance from the center to the first hole is 5.75 R. The distance from the center to the second hole is 6.125 R. The distance from the center to the third hole is 6.50 R. The distance between the first and second hole is 0.250 R. The distance between the second and third hole is 0.250 R.

~~SECRET~~

OCT 1 1954

CONFIDENTIAL
SECRET



A16551 C

REVISIONS

MATERIAL SPEC.	
0.125 24-ST. ALUMINUM	
DR. JCH	APP.
CHK.	APP.
DATE: 8-5-54	SCALE: FULL
NAME	
VALVE MOUNTING RING	
A16551 C	

0.125
CONFIDENTIAL
SECRET

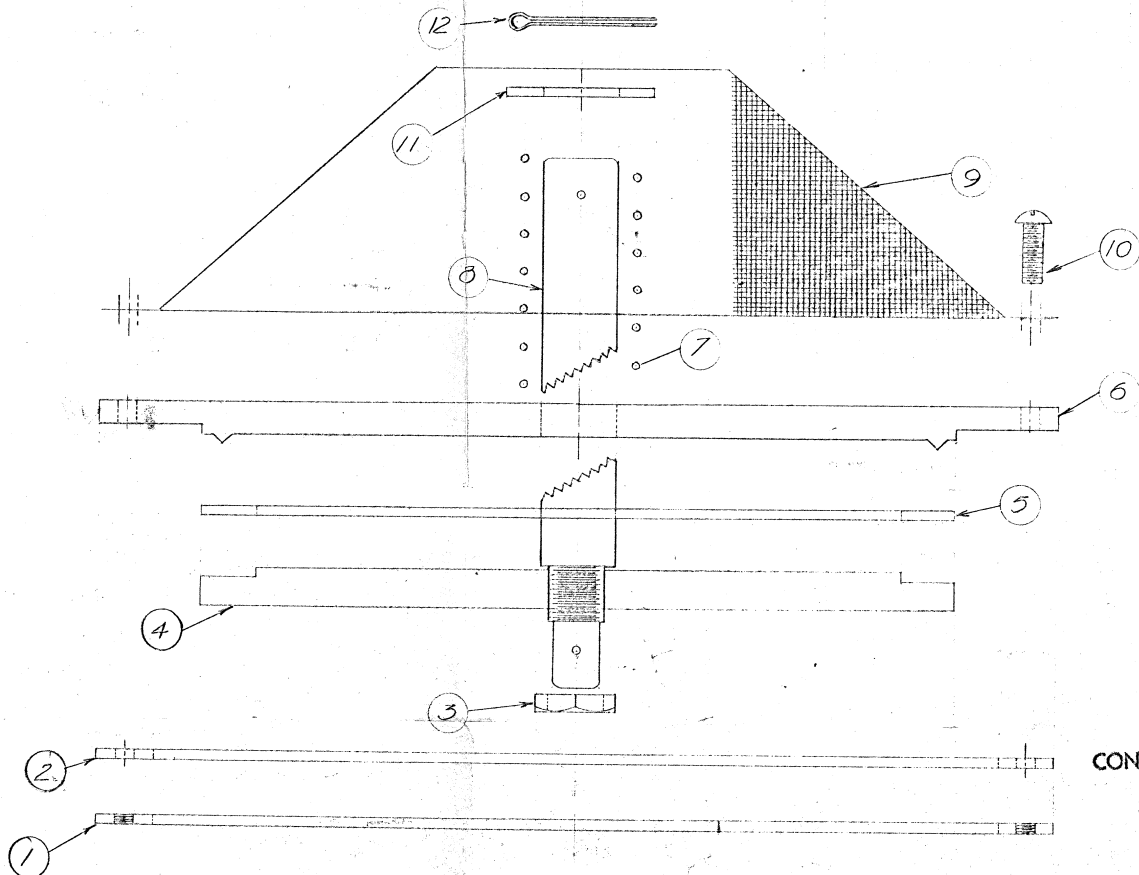
OCT 1 1954

CONFIDENTIAL

SECRET

BILL OF MATERIALS

ITEM	NAME	NO. REQ'D	DRAW. NO.
1	VALVE MOUNTING RING		A16551 C
2	VALVE MOUNTING GASKET		A16552 C
3	STUD NUT		
4	VALVE SEAT MOUNTING DISK		A16523 C
5	VALVE SEAT		A16553 B
6	VALVE PLATE		A16521 C
7	VALVE SPRING		A16525 A
8	VALVE STUD		A16524 A
9	VALVE SCREEN		A16554 C
10	WASHER		
11	COTTER PIN		
12			



CONFIDENTIAL

SECRET

OCT 1 1954

A16555 C

REVISIONS

NOTED

DR. JCW APP. HEF

CH. HEF APP.

DATE 5-54 SCALE FULL

NAME

M3 VALVE

ASSEMBLY

A16555 C

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SECRET
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